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THE IMPACT OF PULPWOOD RAIL FREIGHT COSTS ON THE MINNESOTA-WISCONSIN PULPWOOD MARKET

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ABSTRACT.--Transportation costs affect the marketing and utilization of pulpwood. Their impact on the procurement and utilization of pulpwood often prove difficult to measure because deriving an average annual measure of the transportation cost is difficult. This note, by means of a simple index method for measuring regional inter-State pulpwood rail freight costs, illustrates that the cost for shipping pulpwood from Minnesota to Wisconsin by rail more than doubled between 1946 and 1958. In 1959 rates declined slightly and remained stable before escalating in the late 1960's and early 1970's to more than three times the 1946 rate. Rail rates were estimated to have a significant impact on shipments of pulpwood from Minnesota to Wisconsin mills, and Wisconsin mill utilization of both softwood and hardwood pulpwood.

OXFORD: 783:717. KEY WORDS: pulpwood marketing, pulpwood freight rate index.

Because pulpwood is a bulky raw material with a low value-weight ratio, rail freight costs often account for a major portion of the total delivered cost of pulpwood to a mill. Even small changes in freight costs can affect mode of transportation, size and location of procurement areas, and kind of material used at the mill. So, measuring transportation costs is important to the industry as well as to economists attempting to analyze the behavior of pulpwood markets.

Unfortunately, it is difficult to derive an average annual measure of the cost of transportation. So we devised a simple index for measuring regional pulpwood rail freight costs and applied it to the Minnesota-to-Wisconsin inter-State pulpwood rail transportation cost trend. This enabled us to evaluate the influence of rail rates on the behavior of the Minnesota-Wisconsin pulpwood market.

The index is most useful when applied directly to regions where there is inter-State pulpwood traffic, i.e., where tariffs are governed by the Interstate Commerce Commission. Adjustments or changes in inter-State tariff schedules are nearly always percentage changes that apply across-the-board for all origin-destination points. This is not always the case with intra-State tariffs, where individual mills may negotiate rate changes with the railroads on pulpwood shipped over specific routes. Thus, in regions where intra-State rail shipments are common, the inter-State index may represent only an indication of the real cost relation.

CALCULATING THE INDEX

To calculate the index, first select a major pulpwood loading concentration point and pulpmill destination between which there are inter-State pulpwood shipments. Then obtain freight rate tariffs and their effective dates from the railroad moving pulpwood along the route. Next, multiply each

tariff rate by the number of months it was in effect during a specific year, add the products together, and divide by 12 to get an average tariff for each year. Finally, assuming the first year's tariff to be 100 percent, calculate the indexes for the subsequent years as percentage deviations from this "base" year.

APPLYING THE INDEX TO MINNESOTA-WISCONSIN INTERSTATE PULPWOOD FREIGHT TARIFFS

Using the above procedure, we derived an index of inter-State pulpwood rail freight costs for Minnesota-to-Wisconsin shipments for the period 1946 to 1975 (fig. 1). It shows that the cost of shipping pulpwood by rail from Minnesota to Wisconsin more than doubled between 1946 and 1958. At that point changes in the tariff schedule were negotiated industry-wide and in 1959 the rates declined. Throughout most of the 1960's the rates remained stable before rapidly escalating in the late 1960's and early 1970's to more than three times the 1946 rate. Although published prices for pulpwood increased gradually throughout the major portion of the period (until the mid 1970's), transportation costs have represented an increasing share of the total cost of pulpwood to the mill.

Within both the Minnesota and Wisconsin roundwood pulpwood markets utilization of hardwood pulpwood has gained at the expense of softwood pulpwood since World War II. For example, the utilization of hardwood roundwood increased about 4-1/2 percent annually in both Minnesota and Wisconsin. Softwood roundwood utilization, on the other hand, decreased about 0.2 percent annually in Minnesota and 2.2 percent annually in Wisconsin.

Historically, Minnesota has been a primary pulpwood supplier for Wisconsin mills, and most of the shipments have been by rail in the last quarter century. However, pulpwood shipments from Minnesota to Wisconsin have decreased from approximately 400,000 cords during the early part of the period to just under 200,000 cords in 1973. The decrease in shipments in terms of total Minnesota production is even greater (fig. 2).

How are these trends related to pulpwood rail freight costs? In a recent study of the 1946 to 1969 period[1], many Minnesota and Wisconsin pulp and paper mill officials cited changing transportation costs as a major reason for the increased importance

[1] *Lothner, David C. 1974. The Minnesota and Wisconsin pulpwood markets: and econometric study of past changes and the future outlook for forest resource planning. 215 p. Unpubl. Ph.D. Diss., Univ. Minn.*

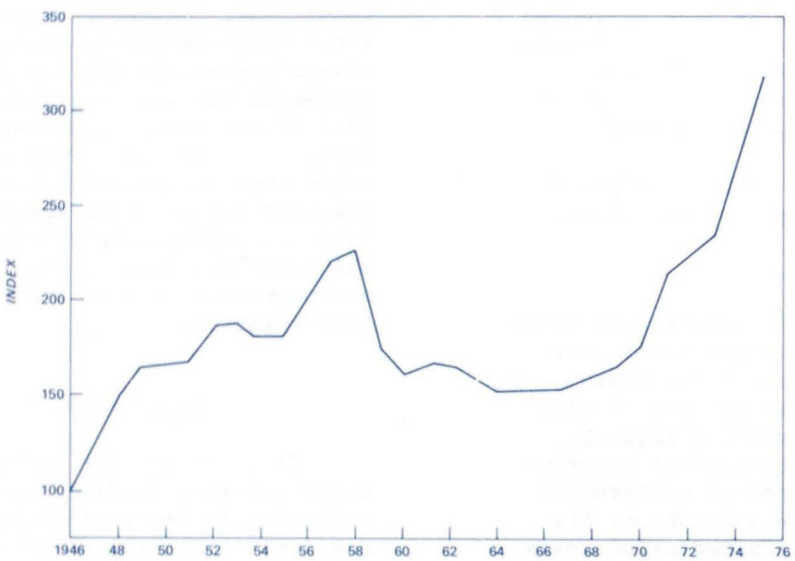

Figure 1.--*Minnesota to Wisconsin inter-State roundwood pulpwood freight rate index, 1946 to 1975.*

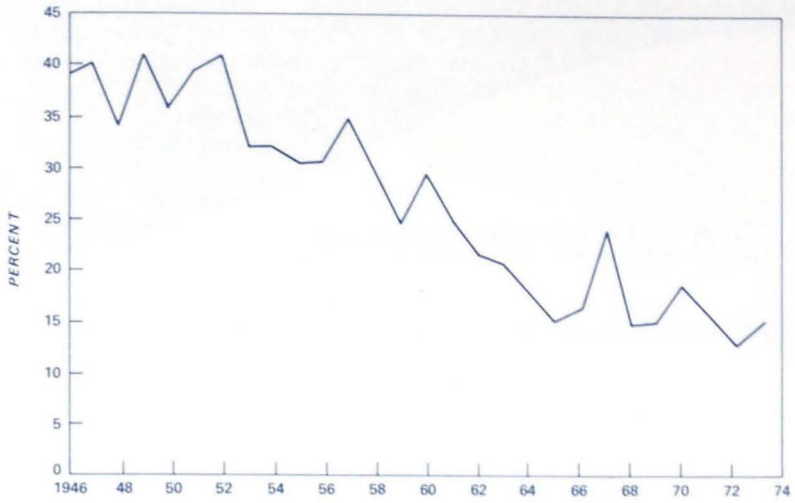

Figure 2.--*The percent of Minnesota-produced roundwood pulpwood shipped to Wisconsin, 1946 to 1973.*

of hardwood pulpwood, shifts in procurement areas, and the use of increased amounts of softwood *wood pulp* from outside the region. It was implied that mills often obtain more competitive rates on wood pulp from farther distances (outside the Lakes States region) than on pulpwood nearer the pulp mills.

A model of the Minnesota-Wisconsin pulpwood market was developed in which the rail freight index was one of several variables analyzed.

Increased rail rates, as indicated by the index, reduced Minnesota shipments of pulpwood to Wisconsin mills: For every 1 percent increase in freight costs, Minnesota shipments of pulpwood to Wisconsin decreased by 0.75 percent, all other things remaining constant. Rail rate increases also decreased roundwood softwood utilization while increasing roundwood hardwood utilization by Wisconsin mills: for every 1 percent increase in freight costs the utilization of softwood roundwood pulpwood by Wisconsin's pulp mills decreased by 0.22 percent, all other things remaining constant, and the utilization of hardwood roundwood pulpwood by Wisconsin pulpmills increased by 1.07 percent.

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